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ABSTRACT

There are qualities or organizational principles in discourse that determine its information structure and contribute to its communicative dynamism. A "wave" model of discourse analysis shows graphically how each successive item of new information in a text provides a platform for the next new item, or "wave," of information. The model is based on the following concepts: (1) new information tends to come near the end of information units, and assumed or understood information at the beginning; (2) information tends to be ordered from left to right in the information unit according to its degree of informativity; (3) in descriptive scientific texts, there is a tendency for the structural/concrete to precede the functional/abstract; and (4) the degree of informativity of a clause or sentence can determine its position in the left-right hierarchy of a sentence or thematic unit. Using the model, the student can ask questions to test the purpose and appropriateness of an utterance by matching what the utterance seems to be answering against what it should answer in light of contextual and rhetorical expectation. The model is illustrated using a paragraph classifying three muscle types in the body. A brief bibliography is included. (MSE)

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COMMUNICATIVE DYNAMISM IN EXPOSITORY ACADEMIC ENGLISH : SOME STRATEGIES IN TEACHING THE PRAGMATICS OF WRITING[1]

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Introduction

There has been a tendency when teaching writing, more than in teaching oral communication, to concentrate on the surface of discourse - on the mechanics of syntactic construction and, more recently, on the cohesive features of text. Even the identification of distinct rhetorical patterns was initially based on frequency counts of lexical and syntactic occurrences. At the same time, however, EL2-medium students are often being taught how to read for the writer's intention, and to identify his or her main and supporting ideas - altogether a higher level of discourse processing. Why is it that there should be such a gulf between teaching expectations in the two areas?

One obvious answer is that it is easier to receive ideas than to produce them - you cannot ask students of writing to run before they can walk! But I suggest that many students of writing are not even being taught properly how to walk; it is as if they were being asked to watch their feet, instead of looking ahead with purpose and a sense of direction, and learning to negotiate slopes and obstacles by either slowing or quickening their stride. This fanciful analogy is intended to imply that by focusing on the mechanics of writing at the expense of its purpose, context and accessibility, we are not:

a) helping the student keep his overall communicative objectives and the needs of the reader in mind; or
b) motivating him, by offering him meaningful & communicative writing tasks.

A revision of teaching materials requires a revised teaching approach; such a revision must entail a re-examination of how interlocutors negotiate written discourse before attempting any prescription of principles or practice.

The Negotiation of Discourse

How can we characterise the relationship between writer and reader, our negotiators at the discourse table? Both can be seen to be driven by a 'co-operative imperative', to borrow Widdowson's term (1983: 47). The writer's motive for co-operation can be seen as integrative, as he seeks to follow rhetorical conventions laid down within his particular speech 'community' (social, academic, etc.), while the reader's motive to co-operate can be seen as more instrumental: he has approached the text in search of the information the writer is offering. The relationship could be called transactional - indeed, Brown & Yule (1983) have characterised the kind of discourse we are concerned with, within academic discourse, as 'transactional' or message-oriented discourse, with its primary goal the 'efficient transference of information'.

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Written discourse, then, can be just as interactive as spoken discourse, with the writer aware of the reader's need for the discourse to be optimally informative and accessible. It is in his writing that the student needs to display his grasp of the pragmatics of information transaction. Hoey (1983) suggests that the written monologue is a specialised form of dialogue between writer and reader, with the reader developing expectations of the text and hazarding 'guesses' about the coming content and its relationship to what has preceded. It is a persuasive argument that such a questioning strategy underpins the interpretation of discourse, clarifying both the purpose and relevance of the text as a whole, and the organisation of the text at every level. Before exploring the practical applications of this strategy, however, it is necessary to establish first how we conceive of the reader's interpretation, or processing, of discourse.

The Processing Of Discourse

Few people are still persuaded that discourse is processed by being atomised according to a system of linguistic rules. There is growing acceptance of the psycholinguistic view that discourse is processed, i.e. interpreted and stored, as a pattern of cognitive structures which 'allow for the organisation of information in long-term memory' (Widdowson 1983: 34). Widdowson suggests the term 'schemata' to cover two distinct levels of information: 'frames of reference', for the propositional (semantic) content of discourse, and 'rhetorical routines', for its illocutionary (pragmatic) and procedural aspects.

How, then, does interpretation take place? To interpret incoming information, the reader formulates 'a set of expectations derived from previous experience, which are projected onto instances of actual language behaviour' (Widdowson 1983:35). These expectations can be usefully seen as generating sets of questions of varying degrees of generality and scope (Hoey 1983), falling into two main categories: anticipatory and reflective.

A. Anticipatory questions

- posed as the reader projects his expectations.
Eg. in a text on the digestive system, in response to the statement: "The fats in the ileum are broken down by a substance called bile.", the reader is likely to ask "What about bile?", or "What else should I know about bile?"; he may even ask "Bile? What's that?". The type and precision of the question will be determined by the level of knowledge of the subject and of the rhetorical routine of anatomical & physiological description shared by writer and reader.

B. Reflective questions

- posed when the anticipatory question is answered with information that causes the reader difficulty in processing the discourse. If the above sentence were to be followed by "Rome is the capital of Italy.", the reader would be prompted to ask "Why this now?". The sentence is grammatically correct, but the proposition is totally irrelevant to the topic under discussion. This is an extreme example; it may be that the next sentence is quite relevant, but that the reader had not anticipated the information given, and has to pause to accommodate this new information into his schema of the digestive process.

I have, so far, concentrated on the reader; but it should not be over-looked that the writer, too, has to adapt the formulation of his schemata in his attempt to 'transfer' his information to the reader. The writer is aware of the fine line he must tread between being informative and yet leaving the text accessible to the reader, and it is the balance of these two communicative qualities - informativity & accessibility - of which native speakers of a language develop an intuitive command. Our problem with many language students is that, although they employ these communicative strategies intuitively in their own language, they have invariably had ingrained into them a writing strategy equivalent to "Watch your feet!" This preoccupation with what they might stand in (error!), rather than with the purpose, speed and direction (appropriacy) of their activity, can only retard their acquisition of target writing skills.

We turn our attention now to the discourse itself, to identifying the qualities that give a text 'good' information structure, and to suggesting how these can be communicated to the learner.

Information Structure: Principles & Strategies

We should first establish what we mean by 'information structure'. Good information structure will reflect the efficient organisation of the propositional content of the discourse and its communication in an informative and accessible manner.

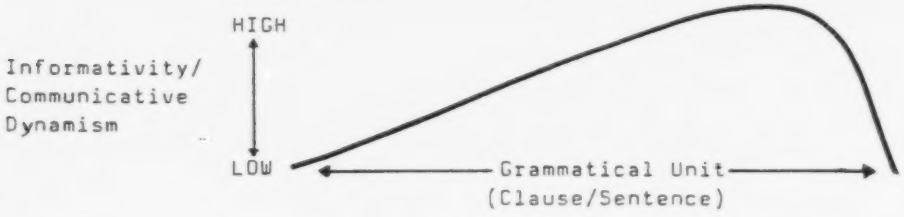
The most important rhetorical (structural) feature of English-language texts is the 'peaking' of informativity towards the end of each grammatical unit, whether clause or complex sentence. This patterning, throwing the new and important information to the end of the sentence, gives English discourse a kind of forward momentum - what Firbas (1971) describes as 'communicative dynamism' (henceforth CD). CD can be described as that quality, or aggregate of qualities, in a text which impels a reader through that text, and which 'pushes the communication forward' (Firbas 1971: 136).

A concern for optimal communicative dynamism can be seen as the fundamental principle governing rhetorical structure in an informative text - both at the interactive level and, in the recorded expression of that interaction, at the textual level. On the interactive level, maximising CD requires an effort by the writer to maintain the reader's interest by being brief, clear and relevant, and by judging how much the reader wants and needs to know - to paraphrase Grice's 'Co-operative Principle' (1975). At the textual level, CD is enhanced by the attribution of focal prominence to information within and above the level of the sentence, decided according to a number of criteria (not all of which can be dealt with in this paper):

a) Givenness & Newness
b) Logical & Temporal Sequence
c) Informativity peaking at the end of a grammatical unit
d) Left-to-right increase of propositional complexity in 'thematic' units (see Fig. 4)
e) Attenuation of Reference (e.g. Lexical substitution)
f) Parallellism: Matching syntactic patterns
g) Ellipsis in cases of thematic redundancy (see Fig. 3)

It is not enough to illustrate these principles for the teacher's benefit; our aim must be to tailor them for assimilation by the learner. We need to explore effective ways of doing this, and as a step in this direction I propose a 'Wave' model, a device designed to give graphic reinforcement to the notions of focal prominence and communicative dynamism (see Fig. 1). The 'Wave' is based on the notion of a Given-New information cycle, where each successive item of new information provides a platform for the next new item; 'this sequence can be conceived as a series of overlapping 'waves' of information, with the crest of the wave marking the peak of focal prominence of information in a clause or sentence; just as a wave spends its force only once, so the newness of a piece of information is exhausted upon utterance'. (Bruce 1984).

Figure 1 : The Wave Model showing CD Distribution in Grammatical Units



We have now identified two different strategies, both analytical and, at the same time, heuristic (in the sense of 'helping to learn or understand'), which are intended to help students:

a) identify features of communicative dynamism in texts, and also analyse texts - especially their own - for the presence or absence of these qualities; &
b) apply these principles to their own writing.

When we speak of information structure, it should be clear that the structural realisation of a message cannot be considered separately from that message's rhetorical function or purpose. All the features of CD we have identified exist to make the discourse more accessible to the reader. In teaching these features, we are assuming a basic comprehension of, and ability to manipulate, grammatical structures. We are also assuming that this grammatical knowledge is not greatly helping the student to communicate in writing at the level of discourse - i.e. above the level of the sentence and at the level of the logical and informative transference of a message.

Teaching Information Structure

I propose to examine written discourse at three levels - clause, sentence (& 'thematic unit') and paragraph - to illustrate how 'peaking of informativity' can be effected and can enhance CD in information units of varying length and complexity. I shall explore the questioning strategy and 'Wave' device as means of teaching the concept of communicative dynamism and certain rhetorical principles governing information structure.

The concern here is with a specific type of discourse: academic scientific discourse, and our text samples are taken from materials used on 1st-year Pre-Medical English courses at Kuwait University. The 1st-year students are taught mainly descriptive writing, an area of discourse which Hoey (1983) suggests features two basic categories of notional relation: Matching and Logical Sequence. 'Matching' texts typically feature rhetorical functions like definition, comparison & contrast and exemplification, while 'Logical Sequence' texts feature functions like procedure, cause & effect and actions in sequence (non-procedural).

I have selected different rhetorical functions for each level of text, to show the importance of focal prominence to a text's communicative dynamism at different levels of organisation, and to offer practical examples for classroom exploitation:

A. Clause & Compound Sentence - Experimental Procedure (Logical Sequence.)
B. Complex Sentence (& 'Thematic Unit') - Definition (Matching)
C. Paragraph - Classification/Comparison (Matching)

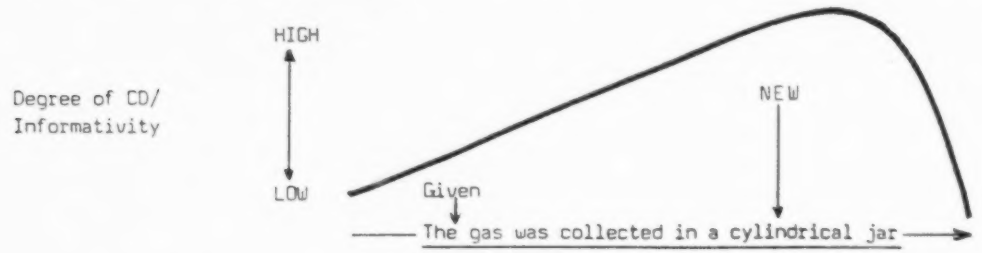
A. Clause & Compound Sentence (in Experimental Procedure)

Sample clause: "The gas was collected in a cylindrical jar."

Even in isolation, this clause can yield a considerable amount of information about its probable context and illocutionary force. A science student will immediately guess the rhetorical routine of experimental reporting, and this will ease our task in getting them to appreciate the relevance and utility of our analytical tools of questions and 'Wave' model.

If we apply our 'Wave' model to this clause, we can see that the informative, and therefore end-prominent, part of the sentence is either 'in a cylindrical jar' or 'was collected in a cylindrical jar' (see Fig. 2).

Fig. 2 The 'Wave' model applied to a simple sentence



'The gas', the topic of our sentence, is low in informativity - in Firbas' terms, it 'has low CD'. Since it is thematised, we can suppose that it is 'given' information and that it is, in Halliday's (1967) terms: "What is being talked about". What about the import of the rest of the sentence? If we now apply our strategy of turning monologue into dialogue, in search of the implicit question which prompted this utterance, we should end up with either:

a) "What happened to the gas?"
or b) "What was the gas collected in?"

In the absence of context or intonation to help disambiguate, we have to apply the 'informativity' test. For question b) to be appropriate, we would previously have had to be told about both the gas and its collection, so the writer would be flouting the co-operative and informativity principles by repeating so much of the discourse.

Having got the students thinking about information structure along these lines, we can give them a task that will require them to apply the principles they have learned. The questioning procedure should allow students to test the discourse principles they have been taught. Below is a detailed account of how this "internal dialogue" might be expected to proceed.

Task for Students: Having analysed the isolated clause given above for its probable context and meaning, the students should be given the first half of the 'procedure' report and asked if the isolated sentence provides an appropriate sequel. This text is as follows:

> "(1) 20 grams of large pieces of zinc were measured out and poured into the gas generating bottle, which was then stoppered tightly. (2) Next, dilute hydrochloric acid was poured through the thistle tube until it covered the zinc completely. (3) The acid then began to react with the zinc to produce hydrogen gas."

The students should be asked to identify the three procedural questions that prompted the three sentences. These could be as follows:

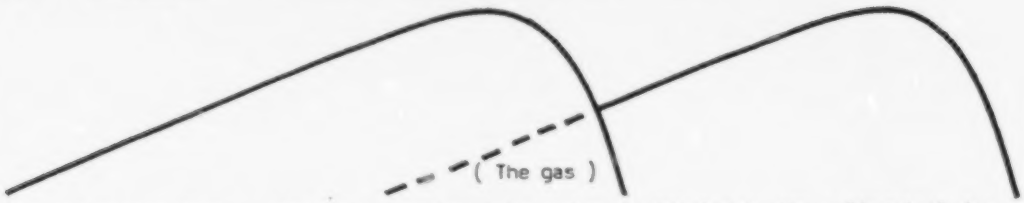
(1) What happened first? or: What was done first?
(2) What happened next? or: What was done next?
(3) What was the result/reaction?

Expectations of what should follow may be vague, as these three sentences complete one discrete micro-function - the description of the production of the gas - and a 'function shift' is now expected, i.e. description of the storage of the gas. The students should be asked what information the last of the three sentences in the text leads them to expect now. Would our initial sentence ("The gas was collected in a cylindrical jar") meet their expectations? This is doubtful. If not from the list or diagram of the apparatus, then from their background rhetorical knowledge (of experimental reports), the students will expect some mention of the passage of the gas from the gas generating bottle into the cylinder. There is also the prior intervention of the experimenter to invert the water-filled cylindrical jar over a shelf in the water-filled trough; this intermediary proposition having been supplied, the students can be asked to complete the paragraph. This should appear roughly as follows:

> "The gas passed down into the trough through the rubber tube and was collected in the cylindrical jar."

The last two propositions are combined into a compound sentence, offering us the opportunity to demonstrate the CD properties of parallellism and the function of ellipsis in cases of thematic repetition & consequent redundancy. The 'Wave' model in series illustrates this very clearly - as shown in Fig. 3, we simply 'curtail' the second wave and produce one sentence with two peaks of prominence.

Fig. 3 The 'Wave' model applied in series to a compound sentence



The gas passed down ... trough ... rubber tube and was collected in the cylindrical jar

This is a graphic illustration of how informativity is maximised with no loss of accessibility to the reader.

B. & C. Complex Sentence, 'Thematic Unit' & Paragraph (Matching pattern)

In examining the information structure of a single clause from a logical sequence type of text, I focused mainly on the distribution of Given and New information, and the tendency for parallelism of structure to feature in instances of thematic recurrence. In my examination of larger stretches of text - the 'thematic unit' and the paragraph - I shall be looking at the 'Matching' text pattern, common in the description of systems in Anatomy and Physiology. The system - types of muscle, in the text used below - is classified into its constituent parts, and these in turn are described in terms of their constituent properties, locations and functions. We are no longer looking for a peak of informativity within a proposition, but rather between propositions. Since Matching propositions tend to be independent of each other and hence equal in value, this raises the question as to whether an order among propositions, from left to right, is established according to context or whether there is a logical order based here on a saliency hierarchy which determines notional sequence in descriptive scientific discourse. We are on speculative ground here, but propose to explore these larger sections of text for patterns of information structure which enhance a text's communicative dynamism.

Complex Sentence & Thematic Unit

A complex sentence - or perhaps two consecutive sentences - is usually sufficient for the identification of the distinguishing properties of an organism in a classification text, at least in undergraduate textbooks. We can refer to this level of text as a 'thematic unit', where all the information is 'about' the one theme, as in:

> "Cardiac muscle, found only in the heart, is feather-like in appearance. Its function is to maintain the pumping action of the heart."

There are three notional 'slots' being 'filled in' in our 'heart muscle' schema: property, location and function. If we apply our 'wave' model to this thematic unit, it would suggest that function is the most important and informative notion identifying 'cardiac muscle' here (see Fig. 4).

Fig. 4 The 'Wave' model applied in series to a 'Thematic' unit

Is there, then, some conventional logic to this sequence? If we once again turn the monologue into dialogue, we might end up with:

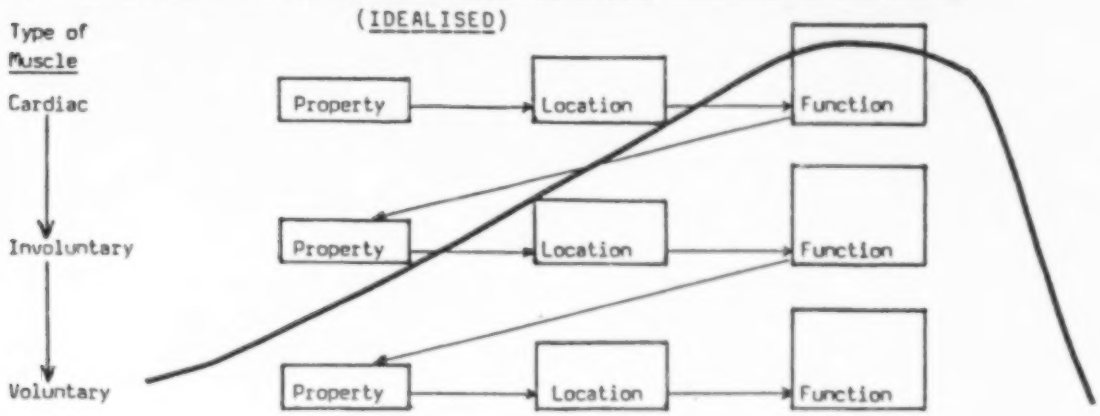
a) What is it like?
b) Where is it located/found?
c) What does it do? or: What is its function?

This sequence tends to suggest that the stative precedes the dynamic or operative, that structure is subordinate to function, and that one proceeds logically from the concrete to the abstract. There is one piece of 'textual' evidence to support this intuition and that is the progressive increase in the length of successive propositions within the thematic unit. This in itself can have two different explanations: either 'function' requires more 'discourse space' than the other notions to achieve the minimum necessary informativity, or it is accorded more space because of its predominant position in the notional hierarchy - irrespective of context. Application of our co-operative and informativity principles would favour the former 'situation-specific' explanation, and a look at the short 'cardiac muscle' text in its wider context (below) will show why.

Paragraph

Examining the complete text - the paragraph classifying the three types of muscle in the body - allows us to consider whether or not there is an underlying notional hierarchy in descriptive scientific texts. If there is, this would entitle us to describe the thematic unit above as having 'unmarked' structure. If this is the case, then any deviation from this notional pattern will yield 'marked' information structure. The complete text below yields several examples of such 'marked' structure - i.e. deviation from the 'property-location-function' notional sequence attributed 'unmarked' status. Can we divine any further principle of information structure which would account for this deviation? On the evidence of this text, it would seem that textual proximity is necessary for statements contrasting, or distinguishing between two adjacent entities in a Matching relation (such as classification). To illustrate what we mean, let us project an ideal unmarked pattern for this classification of muscle types, before comparing it to the marked (and real) version.

Fig. 5 Model of parallel pattern of end-focus in information structure in a paragraph



KEY : the height of the box reflects the relative amount of information, roughly estimated by the number of words used to describe each feature.

In the actual text, however, we do not find this ideal parallellism. This text (below) was composed for a 1st-year Pre-Medical course to exemplify the information structure typical of a paragraph of anatomical classification.

Matching Relation Text: Muscle Classification Paragraph

"There are 3 types of muscle in the muscular system: cardiac, involuntary and voluntary. Cardiac muscle, found only in the heart, is feather-like in appearance. Its function is to maintain the pumping action of the heart. Involuntary muscle, also called smooth muscle because of its smooth appearance, is found in the internal organs, such as the oesophagus, stomach and the small and large intestines, i.e. in those places where movements are essential to internal body processes. Involuntary muscles can be defined as those muscles we cannot consciously control. Voluntary muscles, also called striped or striated muscles, are defined as those muscles we can consciously control. These muscles generally control body movement. Voluntary muscles are found in the face, neck, arms and legs. In appearance, voluntary muscles are striped and have a glossy, hard outer covering called a sheath. There is a case in which voluntary muscles act in an involuntary manner - e.g. the eyelids will blink involuntarily if subjected to strong light. Such an action is called a reflex action."

The information in this text was structured mainly by following native-speaker intuition, rather than by any attempt to exemplify a CD model, e.g. of parallellism of notional sequence. One can discern deviation from such a pattern in the notional sequencing in the 'Voluntary muscles' thematic unit. One might also have expected more lexical signals of comparison or contrast (e.g. 'however', 'on the other hand'), but, in fact, much information is signalled by the use of 'notional' signalling: for Property - 'in appearance'; for Location - '.. is found in ...', & for Function, simply 'its function is to ...'.

The main reason for the absence of sentence connectors is that the writer expects the reader to be familiar with the rhetorical routine of anatomical classification and consequently to be able to anticipate certain information in a certain order. More specifically, the reader is 'expected' to anticipate that:

1. Concrete and 'physical' information will precede abstract and functional information, irrespective of its importance for the overall message, except for:

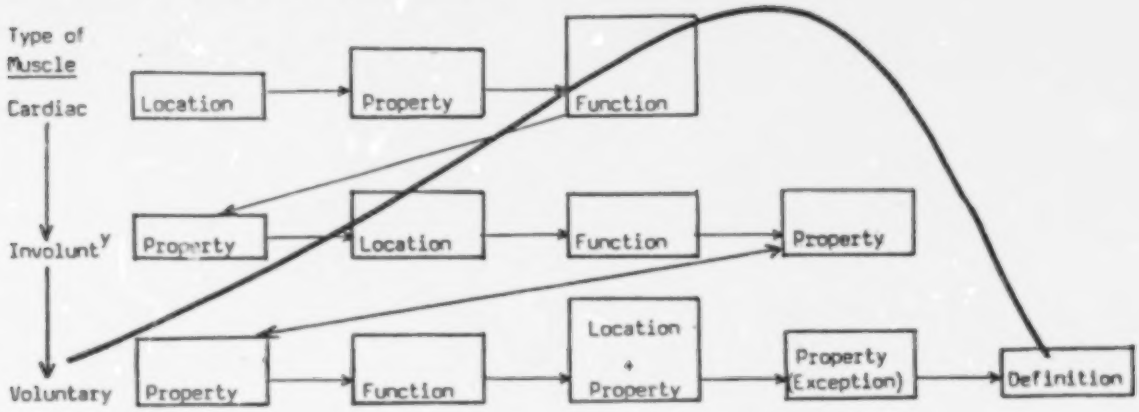
2. Where one particular property manifests the main distinction between two adjacent thematic units (types of muscle), the properties in question are placed as close together in the text as possible. This can mean either that a property which is given end-focus in one thematic unit may be brought forward to the beginning of the next 'matched' thematic unit, or that, as in this text, the same contrast is achieved by holding over information about the property of one muscle (Voluntary) to the end of a thematic unit so that it stands adjacent & in contrast to the matching property of another muscle (Involuntary).

   It is a moot point as to whether this adjacency of 'cannot' (1.9) vs. 'can consciously control' (1.11) successfully gets across this key distinction between the two types of muscle, involuntary & voluntary - especially since there are no explicit contrastive signals nor, of course, intonation to rescue the meaning. There is a good argument for the acceptance of underlining as the 'paragraphological' equivalent to phonological stress for the purpose of indicating marked information focus in the written text.

3. More important information will take up more space in the text, and these longer clauses will tend to be given end-focus. The influence of the intonation patterns of spoken English may be significant here; it might be suggested that the longer the clause, the greater the range of pitch and the progressively more pronounced the 'tone contours' (cf. Halliday 1978). The 'Wave' is in a sense an 'informativity contour', sharing the tone contour's point of focal prominence but free of the need to reflect the tonal nuances of mood, modality and key (cf. Halliday 1976: 227)

How then are we to make use of our 'Wave' model to teach our students something about information structure at the level of the paragraph? As suggested above, the model in Fig. 5 can be applied to the 'real' text. The teacher can ask the students to use the model in Fig. 5 to analyse the text for its notional content and sequence, and perhaps to criticise it for any deviation from the more basic principles (points 1 & 3) outlined above. Fig. 6 below shows a suggested break-down of this notional pattern, with the 'wave' superimposed as a guide for the students.

Fig. 6 Model of Fig. 5 applied to Muscle Classification text



Conclusion

This has been an exploratory essay, attempting to re-examine many of our assumptions about the nature of written discourse and how it is processed and produced. I have suggested that there are qualities or organisational principles in discourse that determine its information structure, and contribute to its communicative dynamism. The aim has essentially been to stimulate thought and offer a different perspective on the teaching of academic written English.

Finally, here is a summary of the main points about communicative dynamism and principles of information structure that I hope the 'Wave' model and the question strategy can help teach our students:

1. New information tends to feature near the end of information units and given information at the beginning; 'what you're talking about' is logically followed by 'what you're saying about it'.

2. Information tends to be ordered from left to right according to its degree of informativity; in descriptive scientific texts, there is a tendency for the structural/concrete to precede the functional/abstract.

3. The degree of informativity of a clause/sentence can determine its position in the left-to-right 'hierarchy' of a sentence or thematic unit.

4. Questions help test the purpose and appropriacy of an utterance by matching what the utterance seems to be answering against what it should be answering in the light of contextual and rhetorical expectation.

NOTE

1. This is a revised version of a paper published in the Proceedings of the 5th European LSP Symposium, Brussels: AUCA.

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